

**Notice of Allowability**

Application No.

10/564,048

Examiner

Dixomara Vargas

Applicant(s)

FOXALL ET AL.

Art Unit

2859

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Amendment filed 01/31/07.
2. ☒ The allowed claim(s) is/are 1-7, 9-16 and 18-27.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All   b) ☐ Some\*   c) ☐ None   of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
  - \* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413),  
Paper No./Mail Date attached herein.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

## DETAILED ACTION

### EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Thomas E. Kocovsky, Jr. on 04/10/07.

The application has been amended as follows:

- a. In claim 1, line 12, after "parameters;," delete "and".
- b. In claim 1, line 13, after "coils", insert -- ; and generating an image with the magnetic resonance scanner --.
- c. In claim 7, line 18, after "parameters;," delete "and".
- d. In claim 7, line 19, after "coils", insert -- ; and generating an image with the magnetic resonance scanner --.
- e. In claim 11, line 22, after "terms;," delete "and".
- f. In claim 11, line 23, after "coils", insert -- ; and generating an image with the magnetic resonance scanner --.
- g. In claim 24, line 1, after "An", insert "apparatus".
- h. In claim 24, line 4, after "blood;" insert -- a means for measuring first and second magnetic resonance echoes emanating from a generally columnar volume; --.

*Allowable Subject Matter*

2. Claims 1-7, 9-16 and 18-27 are allowed.
3. The following is an examiner's statement of reasons for allowance:
  - i. With respect to claim 1, the claim has been found allowable over the prior art of record because the prior art of record fails to teach or fairly suggest a method for shimming a MRI scanner, the method including the step of performing a black blood preparation to suppress magnetic resonance from moving blood in combination with the remaining limitations of the claim.
  - j. With respect to claim 7, the claim has been found allowable over the prior art of record because the prior art of record fails to teach or fairly suggest a method for shimming a MRI scanner, the method including the step of performing at least one of fat suppression and moving blood suppression to suppress magnetic resonance from at least one region of fat and moving blood; computing a mean of the phase-wrapped magnetic field profile; identifying boundaries of at least one usable region corresponding to mean crossings; phase unwrapping the at least one usable region; extracting selected magnetic field parameters from a phase unwrapped magnetic field profile of the usable region; and computing shim currents from the selected magnetic field parameters in combination with the remaining limitations of the claim.
  - k. With respect to claim 11, the claim has been found allowable over the prior art of record because the prior art of record fails to teach or fairly suggest a method for shimming a MRI scanner, the method including the step of performing at least one of fat suppression and moving blood suppression to suppress magnetic resonance from at least

one region of fat and moving blood; spatial orientations of the generally columnar volume, computing a shim current based on the selected magnetic field parameters obtained at the plurality of spatial orientations, the plurality of spatial orientations including at least five spatial orientations, and the extracting selected magnetic field parameters for each spatial orientation including: performing a high-order polynomial fit of order greater than or equal to two of the magnetic field profile to obtain second or higher order magnetic field terms in combination with the remaining limitations of the claim.

l. With respect to claim 21, the claim has been found allowable over the prior art of record because the prior art of record fails to teach or fairly suggest an apparatus for shimming a MRI scanner, the apparatus including a means for performing a black blood preparation prior to the measuring of the first and second MR echoes in combination with the remaining limitations of the claim.

m. With respect to claim 24, the claim has been found allowable over the prior art of record because the prior art of record fails to teach or fairly suggest an apparatus for shimming a MRI scanner, the apparatus including a means for performing at least one of suppression MR in fat and suppression of MR in moving blood; a means for extracting selected magnetic field parameters from the magnetic field profile, the selected magnetic field parameters have order of  $N$  where  $N$  is 2 or more, a number of orientations equals  $2N+1$ ; and a means for solving linear equations to compute shim current based on the selected magnetic field parameters at the plurality of generally columnar volume orientations in combination with the remaining limitations of the claim.

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n. With respect to claims 2-6, 9-10, 12-16, 18-20, 22-23 and 25-27 have been allowed due to its dependency on claims 1, 7, 11, 21 and 24 above.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dixomara Vargas whose telephone number is (571) 272-2252.

The examiner can normally be reached on Monday to Thursday from 8:00 am. to 4:30 pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on (571) 272-2245. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



**Diego Gutierrez**  
**Supervisory Patent Examiner**  
**Technology Center 2800**

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Dixomara Vargas  
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